Abstract

This paper examines the use and consequences of shared compensation plans (profit sharing, profit related pay, SAYE schemes and company stock option plans) in a sample of UK workplaces and firms in the 1990s. The use of these plans has increased over time, in part in response to government programs. The evidence shows that companies and workplaces adopting shared compensation practices have had higher productivity than other firms, but the effects vary among programs, suggesting that the particulars matter a lot in aligning shared compensation and work place activities. Consistent with incentive theory, the evidence also shows that firms and workplaces with shared compensation practices have a higher incidence of shared decision-making/information sharing practices.

Key Words: Productivity, shared modes of compensation.

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Shared Modes of Compensation and Firm Performance: UK Evidence

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"Share ownership offers employees a real stake in their company ... I want, through targeted reform, to reward long term commitment by employees. I want to encourage the new enterprise culture of team work in which everyone contributes and everyone benefits from success."

UK Chancellor of the Exchequer, Mr. Gordon Brown HM Treasury, 1999

Background and Motivation

Many analysts and decision-makers in industry, labor, and government believe that the traditional wage-employment relationship is not appropriate for a modern competitive economy. In place of the historic capital/labor dichotomy, where employers pay a fixed wage for the right to tell employees what to do, a new system has developed, of work arrangements where employees share in the financial fortunes of the firm and make many of the decisions that determine firm performance. This shared capitalist model of work and compensation (Freeman, 1999) dominates new information-technology firms in the US, but it is found in other sectors and countries, as well.

For over two decades, the United Kingdom has tried to encourage shared capitalist practices by offering tax advantages to firms that link pay to profits or that provide company shares to workers or that encourage workers to save through stock options, or that develop approved share option plans. In 1999 the UK government issued draft legislation introducing two new plans: an All Employee Share Plan through which employees will be able to buy "Partnership" shares in their firm out of pre-tax and pre National Insurance Contribution salary; and Enterprise Management Incentives intended to help smaller companies with potential for growth recruit and retain high caliber employees, by giving tax advantages to options granted to a small number of employees[1] By contrast, the government has moved to eliminate tax advantages for profit-related pay, on the notion that many firms used this to get tax-advantages without really linking pay to profits. The 1998 Workplace Employment Relations Survey shows that 86% of the establishments that had profit-related pay were taking advantage of the tax break.

[1] The government planned to introduce new legislation in 2001. See http://www.inlandrevenue.gov.uk/pbr2000/ir2.htm

Behind the desire to increase shared compensation in the UK is the widespread belief, expressed by the Chancellor of the Exchequer, that shared capitalist arrangements will create a better work culture, with improved productivity and commitment by employees. Existing studies on profit-sharing, employee ownership, and employee participation lends general support to this proposition (Kruse, Kruse and Weitzman, OECD, 1995; Doucouliagos, 1995), but these studies also show considerable variability in the effects of practices on firm performance. In addition, the economic context in which the programs operate (e.g. whether information sharing takes place or not) and the details of the schemes seem to affect their success rate.

Our goals address the following two questions. How far has UK moved from standard wage-employment contracts towards a shared mode of compensation? What effect has shared compensation had on economic outcomes?

This paper examines these questions using a 1999 survey of the shared compensation strategies used by a sample of UK listed companies between 1995 and 1998, and the 1998 Workplace Employment Relations Survey (WERS) of some 2000 UK establishments or workplaces, and the 1990-1998 longitudinal WERS panel survey of nearly 900 workplaces. We use these data to describe the growth and use of shared capitalist compensation practices and to assess the effects of these practices on productivity and related economic outcomes. We have three findings:

1. Shared compensation practices are substantial and growing in the UK, in large part in response to Treasury policies designed to encourage them. Upwards of half of UK workplaces have some form of shared compensation programme and over a third had something beyond profit-related pay (which the government abolished as of 2000). Some half of listed firms in our firm-based data also had some form of shared compensation.

2. Firms and establishments with shared compensation, particularly those with deferred profit-sharing and employee share ownership, are more likely to establish formal communication and consultation channels with workers than other establishments.

3. Firms and establishments that use shared compensation tend to outperform other firms and establishments in productivity and financial performance. Moreover, the stock price of firms with shared compensation practices has also performed better than those of other firms. But combining shared compensation and information/communication systems does not add extra productivity impact.

Overall, our findings are quite similar across firm and establishment data sets in telling a

favourable story about shared compensation modes of pay, including the share ownership schemes that have become a UK government priority. The one area where our two data sources tell a different story is with profit-related pay; our firm analysis finds that profit-related pay has no effect on productivity while our establishment data finds an effect.

The remainder of the paper is organized as follows. Section 1 deals with shared compensation policies and practices in the UK. Section 2 asks how should shared compensation arrangements affect firm performance. Sections 3 and 4 provide the main evidence. Section 3 deals with the firm level evidence using the company survey, and Section 4 uses the WERS data. Finally, in Section 5 we offer some concluding remarks.

1. Shared Compensation Policies and Practices in the UK

As noted, the UK has experimented with a rich variety of policies to encourage shared compensation. Exhibit 1 provides a capsule summary of policies from the late 1970s to 2000 divided between schemes designed for all employees and schemes designed for top management and other special workers.

The most widely used system was profit-related pay, which gave income tax relief to workers for compensation related to profits. Profit-related pay schemes were widely adopted after the 1987 introduction of the tax break so that by 1998 32% of British workplaces and 37% of workers were receiving part of their pay for profit-related reasons. However, the Treasury came to view the system as overly open to scam behaviour with firms finding ways to classify any sort of pay as "profit-related" to take advantage of the tax break. It began phasing the program out in 1997. As of 2000, profit-related pay was history in the UK.

The UK government has programmes that encourage firms to pay workers in shares or stock options or that encourage employees to invest in shares. One important UK plan is the *Save as You Earn (SAYE)* share option scheme, which gives tax relief to workers who enter a savings contract that puts money into an account to buy the shares when the period ends. The 1978 Finance Act introduced approved profit-sharing schemes as a vehicle for companies to provide free shares to employees that carry no tax liabilities. This plan is being phased out and replaced by the *All Employee Share Plan,*

which allows firms to give free shares to workers without tax liability and also gives tax breaks to employees who buy shares that they hold for 5 years (with smaller tax breaks to workers who hold them for 3 years).

In addition to these schemes, the UK gives tax advantages to shared compensation plans that go largely to top management. *Company Share Option Plans* allow employees to purchase shares at a pre-determined price at some future date, without paying income tax on the grant or on any increase in the market value of shares. In 2000 the government introduced an *Enterprise Market Incentive* option program to help smaller companies with potential for growth to recruit and retain high caliber employees.

Data on shared compensation in UK

Our information on shared compensation practices in the UK comes from two bodies of data: the Workplace Employment Relations Survey (WERS) and a special survey of listed firms that Martin Conyon and Laura Read conducted in 1999. From the WERS, we use the 1998 cross section survey, which contains information on compensation and employment practices at 2191 workplaces in Britain with 10 or more employees; and the 1990-1998 WERS panel survey, which contains information on 882 surviving workplaces from the 1990 survey. The WERS surveys have extremely high response rates – 80% for the 1998 cross-section and 86% for the 1990-98 longitudinal survey[2] that make it particularly valuable for obtaining an accurate picture of shared compensation practices at British work places. But the WERS is not perfect for our analysis. It has only categorical measures of establishment outcomes (whether productivity and financial performance are a lot or somewhat above or below average in a sector) and little information about the company as a whole. To obtain better data on firm-level compensation strategy and performance, we rely on the Conyon-Read 1999 survey of UK firms listed on the London Stock Exchange.[3] This survey contains 299 completed usable responses from a

[2] Interviews were conducted with a manager in each workplace, and 950 worker representatives were also interviewed, representing 82% of cases where an eligible representative was identified. Completed questionnaires were obtained from 28,323 employees, around two-thirds of those distributed.

[3] Investment trusts were excluded from the sampling frame. Effectively a potential population of 1505 companies was identified on 11 April 1999. The survey questionnaire was sent to the human resource director or company secretary at each firm. Where possible the individual HR director was identified by name and addressed to him or her. We

sample of 1518, giving a response rate of 20%, which is good for surveys of this type. The sample is generally representative of the sampled population.[4] Because these are listed companies, we can measure actual value added and related variables and track share prices, which we cannot do with the WERS data. By combining information from the two sources, we provide more robust results about the effects of shared compensation than would otherwise be the case.

Exhibit 2 contains statistics on shared compensation practices in 1998 from the WERS and WERS panel surveys. The upper panel gives the percentage of firms with the specified compensation practice in 1998, weighted by the sample weights.[5] It shows that the most popular form of shared compensation was profit-related pay or bonuses, the vast majority of which were part of the approved Inland Revenue scheme. The second most important form of shared compensation was "other cash bonus"schemes. This was followed by employee share ownership schemes, covering 14.6% of workplaces and 22% of employees. Deferred profit-sharing schemes were the least frequently used form of shared compensation. The second panel of Exhibit 2 gives figures for non-managerial workers. For the plans on which we have data for all workers and non-managerial workers, the percentages covered are modestly lower for the latter, indicating that the bulk of these plans are offered to the majority of the work force. In fact, questions in the WERS on the proportion of non-managerial workers covered show a bi-modal distribution, with most firms offering plans to 90% to 100% of the work force or to no one. Finally, 11.5% of establishments and 17.3% of workers have some form of group performance related pay.

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administered the survey as follows. There were three waves to the survey. The first was a fax survey, the second a postal survey and the third another fax survey. The number of firms completing the survey in each wave was 157, 80 and 62 respectively. In addition another 52 companies in total responded but declined to take part in the survey. The reasons for not completing the survey included (i) company policy not to complete surveys (ii) do not hold relevant statistics (iii) too busy (iv) not applicable to that company

[4] The procedure involved estimating a standard probit model where the outcome variable was equal to one if the company was in the sample and zero otherwise. The right hand side variables were log market value, log of employment, log of capital and 10 sector dummies. The null hypothesis of no differences between the sample and non-sample firms in terms of these characteristics was tested. This would be confirmed by non-significant coefficients on each of the right hand side variables.In the event, it was found that companies with a high market value were about 4% more likely to respond and companies with more employees were about 4% less likely to respond. Other control variables (capital intensity variable and sector dummies) were not significant.

[5] Weighting by the establishment weights is very important to obtain nation-wide representative figures because of the WERS sampling design. Unweighted figures show much higher proportions with shared capitalist forms of pay, because the sample has disproportionately many large firms with such practices.

The third panel in the exhibit shows the pattern of shared compensation in the longitudinal WERS file in 1998. The questions on shared compensation in the longitudinal file relate specifically to the legal schemes and thus give a more precise link to the policies in Exhibit 1. We report the figures here without taking account of the sample weights because our ensuing analysis focuses on each establishment as an independent observation, and the weights have less meaning given what ultimately turns out to be a relatively small sample of establishments that change their shared compensation strategy. These data show that about 40% of establishments were covered by profit-related pay, about 30% covered by SAYE share options, 21% by discretionary or executive option schemes, and about 8% by deferred profit-sharing or other share ownership schemes.

Turning to our firm based survey, Exhibit 3 gives the prevalence of practices across the sample of listed firms for all employees, and for managerial and non-managerial employees taken separately from 1995 to 1998. Consistent with the establishment results, the data shows that firms in the sample increased their use of Inland Revenue approved compensation practices over this period. For instance, the 31.1% of firms report that use of SAYE schemes in 1995 increased to 45.8% in 1998; the 18.8% who used the (now defunct) approved profit related pay schemes in 1995 increased to 25.1% in 1998; and so on. But the data also show increases in the use of non-approved schemes. The proportion of firms with discretionary option schemes, which are directed at selected employees such as directors doubled over the period from 22.9% in 1995 to 42.8% in 1998. UK firms rarely use company wide bonus schemes related to improvements in productivity. Finally, conditional on having a particular scheme, the data also show that companies are more likely to use shared compensation practices for managerial employees than for non-managerial employees, with one exception: the approved profit related pay schemes (which are phased out as of the year 2000).

2. How Should Shared Compensation Affect Firm Performance?

Agency considerations

In principle, shared compensation should motivate workers to work harder and make decisions favorable to the firm, thereby improving corporate performance and ultimately the present discounted

value of the enterprise. Shared compensation helps resolve the moral hazard problem between the owner of the firm and the employee when effort levels of the employee are not perfectly observed or verified. An optimal second best shared compensation contract motivates the employee to focus upon what the owner cares about while recognizing the trade-off between risk and incentives.

Agency theory predicts that the extent of shared compensation will depend on the characteristics of employees and the firm. The less risk averse the employee, the higher is the optimal sharing rate between the owner and the employee because the employee is more willing to bear the relevant risk. Similarly, the less effort averse the employee, the higher is the optimal sharing rate, since that employee will be more willing to put out the requisite effort. On the firm's side, the greater the likely impact of effort on profits, the bigger is the incentive to link employee income to performance. In addition, the more accurate the firm's signal of employee effort and activity the higher is the optimal sharing rate. The firm should share more rewards when it is more certain that output results come from employee activity, rather than from some exogenous factor. At the same time, the firm should not be able to monitor perfectly the effort/activity of the worker, for if management could do that, it would not need an incentive contract in the first place to induce appropriate employee actions.

This analysis has several implications for understanding shared capitalist arrangements. First, in general we would expect, in the absence of free-rider problems (see below), that shared compensation systems are associated with improved performance. However, the analysis also suggests that firms with shared compensation practices are likely to draw on workers with different characteristics than those that choose other firms – workers with less risk aversion and less disutility from work – and will also have themselves different characteristics than other firms. This creates a problem in inferring causal relations from regressions based on cross-section comparisons. Our response is to rely largely on fixed effects models that contrast a firm before/after introduction of shared compensation practices. This is not perfect, since the introduction of new shared arrangements is itself endogenous, but it does give an accurate picture of performance of the same firm or workplace under different conditions.

Decentralisation of decision-making rights

Second, the analysis suggests that shared compensation should be accompanied by shared decision-making. The process of transforming inputs into outputs in capitalist firms increasingly relies on the

performance of multiple tasks by employees. These tasks are bundled into jobs that vary by the number of tasks performed by the employee as well as the decision-making authority assigned to the worker. The trend in the 1990s has been towards jobs that have a wider variety of tasks and that allow employees to make more decisions. The benefits to the firm of decentralizing decision making authority will depend on such factors as: worker specific (localized) knowledge in the performance of the tasks; the conservation of management time; and more effective motivation of workers. It pays the firm to give incentives to workers only when workers have discretion to vary what they do at workplaces, and it pays management to devolve decisions to employees only when employees have incentives to make decisions that raise the value of the firm. We examine this linkage in our empirical work.

Third, there are potentially important costs to decentralizing decision-making rights. These include agency costs, co-ordination costs, and the inefficient use of central information by local decision-makers. There are also important questions about the potential efficiency effects of all-employee-stock-option plans and other schemes that link worker pay to measures of aggregate company performance rather than to group or workplace performance. Chief executive officers (CEOs) and other top executives can affect share prices, so that options or share ownership can help resolve the principal-agent problem for them (see Conyon and Murphy, 2000). But employees lower in the firms' hierarchy have little direct effect on the company stock price. They lack a clear "line of sight" linking their decisions to the share prices/company profit levels that would affect their pay. As a result, we would expect firms to use more narrowly defined performance targets – establishment, group, or workplace-related incentive pay systems – for these workers, and that those forms of shared compensation would be more effective in motivating workers than programs that link pay to more aggregate measures.

Core and Guay (1999) using US data show that the provision options to all employees are consistent with incentive theory. Firms with more monitoring costs, greater growth opportunities and whose employees have greater marginal products allocate greater amounts of option incentives to all employees.

The free rider problem

The classic problem with any group performance related pay scheme is the free-rider problem (also known as the "1/N problem", where N is the total number of employees in the team or group). In most

work situations, employees perform tasks that involve productive interactions with colleagues where total output reflects the contribution of many individuals. Team production suggests that individual contribution to output cannot be easily identified and compensation must be based on some aggregate measure of output such as team or division output. But in such settings, there is a potentially weak connection between individual effort and reward. If rewards are shared equally on the basis of team production (and rewards cannot exceed the revenues of the group), then each individual has the incentive to shirk because they will gain only 1/N of the combined gains from increased effort (Kruse, 1993; Blasi et al, 1996; Kandel and Lazear, 1992). Each employee hopes that his or her colleague will put forth the greater effort to increase output than doing it themselves, benefiting from increased productivity without bearing the costs.

A number of potential solutions have been suggested to overcome the free-rider problem. One solution is for workers to self-monitor or act as *de-facto* monitors themselves. Another is for firms to invest in policies that promote team culture and employee participation where group incentives provide a substitute for monitoring through peer pressure. This horizontal monitoring may help resolve the free rider problem (Kandel and Lazear, 1992; Lazear, 1995). It is possible that firms that use all-employee stock options or other ownership schemes do so to help create a culture of teamwork and co-operative company spirit that over-rides the free rider problem.

Extant evidence for the UK

There is considerable evidence on the relationship between employee ownership or profit sharing and corporate performance, but less on the relationship between all employee stock options and performance or of individual ownership of shares, which UK legislation favours, and performance. The majority of the studies are of US origin, but there have been some notable British studies and important studies in other countries as well. The first important analysis was the US General Accounting Office study in 1987, which found that Employee Stock Ownership Plans (ESOPs) had an inconclusive impact on outcomes. Since then research findings have been more positive, so that a general summary is moderately favorable to shared compensation. The strongest results are for profit-sharing (Kruse, 1993; Doucouliagos, 1995) while those for employee ownership are more problematic. Kruse and Blasi (1995) report on ten studies of US ESOPs that have compared 'before and after' implementation

productivity effects using large databases. The majority yield positive but often-insignificant estimated effects of ESOP adoption on output.

We briefly summarize extant UK studies. In the 1980s, analysts looked at the impact of profit sharing and employee ownership through co-operatives on firm performance. Using the Workplace Industrial Relations (WIRS) that is the predecessor to the WERS survey, Blanchflower and Oswald (1988) found no relationship between financial performance or the quality of industrial relations and measures of shared compensation: the existence of share ownership, a stock option plan, profit sharing, or bonus scheme. In a sample of about 100 UK companies between 1974 and 1982 Wadhwani and Wall (1990) found weak evidence that profit-sharing boosted productivity. Cable and Wilson (1989) found a positive significant productivity effect for profit sharing in a sample of 52 British engineering firms; that quality circles, briefing groups or job rotation also had a positive effect on productivity too; and that having both profit sharing and employee involvement added most to productivity.

Studies in the 1990s have added to the general picture of modest positive effect of shared compensation on outcomes. Estrin et al (1997) report a productivity improvement of about 6% in cases where profit sharing bonuses were of the order 5% - 10% of market wages. Robinson (1998) found that the Save as You Earn Schemes (SAYE) was associated with a productivity premium of 23% and that consultative/representative forms of employee participation also raised productivity. McNabb and Whitfield (1998) used establishment data from WIRS and found that both financial participation and profit related pay are positively related to financial performance.

In short, the extant UK evidence paints a picture much like that in the US studies: profit-sharing has larger effects than ownership on productivity, but neither are overwhelmingly powerful across studies.

3. Production Function Evidence: Firm Level Results

We begin with our firm-based production function analysis. Appendix A shows the main characteristics of the data in our sample, in addition to the shared compensation characteristics shown in Exhibit 3a and Exhibit 3b. We have information on sales, employment, and capital that allows us to estimate

production functions for 284 companies between 1995 and 1998. Trade union presence is constant across time at around 23%. Our measure of product market competition, the number of firms reporting more than five competitors, increased from 72% of firms in 1995 to 77% in 1999. Our measure of information sharing shows a more marked increase from 43.1% in 1995 to 61% in 1998. However, firms are much less likely to have a joint committee of managers and employees for the purposes of consultation.

To assess the productivity effects of different Inland Revenue approved shared compensation systems on firm level performance, we used a Cobb-Douglas production function of the following form:

$$\text{Log}(Q_{it}) = a_i + ß_1\ln(L_{it}) + ß_2\ln(K_{it}) + ß_3(\text{Union}_{it}) + ß_4(\text{Competition}_{it}) + ß_5(\text{Share Compensation}k_{it}) + ß_t\ (\text{Year Dummies}) + e_{it}$$

where Q is real sales (Datastream item 104),

L is total employment (Datastream item 219),

K is an estimate of the current real capital stock (based on a accrual method);

Union is a time varying measure of trade union presence (available from the survey data);

Competition is product market competition measure (a dummy variable = 1 if more than 5 competitors, available from the survey data)

The key explanatory variables are the measures of shared compensation. They are dummy variables for (i) approved profit-sharing scheme (ii) approved profit related pay scheme (iii) approved all employee share scheme (iv) approved company share option scheme.

The terms a_i are the company fixed effects. By including them we eliminate time invariant firm factors such as short-run managerial ability, risk etc. But a fixed effects model does not resolve all problems with non-experimental data. There remain issues about endogeneity and dynamics. The endogeneity issue is straightforward. Employees in highly profitable firms may demand some form of their pay in the form of shared compensation. However, in the absence of suitable instruments (as in Blanchflower and Oswald, 1988, page 724) we estimated a single equation with fixed effects. The key dynamic issue relates to the timing of the shared compensation practices. Ideally, we would have lagged the compensation practice variables to see whether the introduction of a scheme was subsequently associated with increased productivity or if costs of adjustment delayed its benefits but the short time series precluded this strategy.

Exhibits 4 contain our principal results on the relationship between firm level productivity and

shared modes of compensation. Columns (1) to (4) enter each of the schemes separately into the productivity equation. Column (5) enters each of the four schemes jointly. The calculations show a significant positive correlation between firm productivity and two of the Inland Revenue approved schemes: profit sharing scheme and the company share option plan. We find no evidence of a relationship between the approved profit related pay scheme (no longer in operation as of 2000) or of the approved all employee share option scheme. The coefficient estimates suggest quite large productivity effects. For instance, from column 5 the point estimate on the approved profit sharing scheme (0.173) implies an increase in productivity of 18.9%[6]. Similarly, the productivity effect associated with the approved company share option plan (coefficient estimate 0.121) is 12.2%[7].

The differential effect of the different shared compensation systems fits with our earlier discussion. Approved company share option schemes cover selected employees, typically directors, who can affect company performance in response to stock option incentives. The impact of profit-sharing scheme is more difficult to account for: on the one side, it is based on profits, which are more susceptible to employee effort than share prices, but the reward are shares, which are more risky than would cash or profit-related bonuses. Since the new all employee partnership share system is a close lineal descendent of the approved profit-sharing scheme, the results suggest that the new program will have positive effects. Finally, the negligible coefficient on the profit-related pay scheme (consistent with Blanchflower and Oswald) indicates that the decision to terminate this program will have no adverse productivity effects (though it will hurt employee owned firms that have used the program, such as John Lewis, among others, at least until they find substitute ways to reward staff).

Further experiments were carried out to test the robustness of our firm level findings. We imposed constant returns to scale on the production function. The overall results remained unchanged. For example, the re-estimated full model contained in Exhibit 4 column 5 yielded labour and capital coefficients of respectively 0.789 and 0.211. The qualitative effects of the shared compensation indicator variables remained unaltered. The approved profit related pay and SAYE dummies were insignificant. The point estimate (robust standard error) on the Approved Profit Sharing scheme was

[6] Calculated as $(e^{0.1733} - 1) \times 100$

[7] Calculated as $(e^{0.1213} - 1) \times 100$

0.176 (0.075) and for the Approved Company Share Option plan it was 0.106 (0.064). Both variables are significant though the estimate on the company share option plan falls slightly.

Our firm-based survey also gathered data on whether or not the firm shared information with employees, consulted with employees, or communicated with them extensively. We use these data to develop an information sharing dummy variable for firms that had at least one of the schemes and added this variable to the equation, and interacted it with the shared compensation variables.[8] A positive interaction term indicates that a shared compensation system is more effective in environments where information, consultation and communication between employees and managers is also found. The results of this analysis, given in Appendix B, indicate that information sharing is not associated with higher productivity, conditional on shared compensation, and that the interaction of shared compensation and information sharing, communication and consultation between managers and employees does not contribute to higher productivity.[9]

Finally, (6) and (7) of Exhibit 4 record results of regressions in which we used the percentage of employees covered by the scheme, rather than a 0-1 presence of mode of compensation, as the independent variable.[10] The two columns differentiate the type of employee covered by the shared compensation scheme. Column 6 focuses on managerial employees. Column 7 treats non-managerial employees. This division is motivated by the notion that company share option schemes ought to have a much greater effect among managerial employees, while approved profit-sharing schemes might have a more even-handed impact. The evidence shows a positive though not statistically significant impact of share options for managers on production but no effect for non-managers but shows a larger impact of approved profit-sharing schemes for non-managerial workers. The different proportions of managers and non-managers covered by the schemes, makes it hard to reach a sharp conclusion, however, since the results may be partly driven by those proportions rather than any differences in behaviour.

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[8] The equation is: $Log(Q_{it}) = a_i + ß_1 ln(L_{it}) + ß_2 ln(K_{it}) + ß_3(Union_{it}) + ß_4(Competition_{it}) + ß_5(Share\ Compensation k_{it}) + ß_6(Info.\ Sharing) + ß_7(Infor\ sharing \times Share\ Compensation k_{it}) + ß_t\ (Year\ Dummies) + e_{it}$

[9] Recall that the information sharing variable is made up three other variables. See Exhibit 3. These component variables were tried separately to see whether this altered the results. They did not.

[10] Where a company does not have a scheme the variable is coded zero.

Stock market evidence

A different way to examine the effect of shared compensation on the performance of listed firms is to compare the development of the stock price of firms with shared compensation to the stock prices of other firms. If firms with shared compensation make investments that raise sales in the future and thus raise the value of the firm, this could show up in the growth of their stock prices, but not in current productivity figures.[11] Accordingly, we examined the link between stock prices and the extent of shared compensation. A London firm, Capital Strategies, produces an Employee Ownership Index (EOI) of the share prices of firms that have a "significant degree of employee share ownership", which it then compares to general movements in the London stock market. Exhibit 5 shows that the EOI outperformed the all share index in the 1990s. An investment of £100 in the EOI in 1992 would be worth £667, while the same investment in the FTSE All-Share Index would be worth £244.[12] Using our 299 listed firm data base we identified companies that used approved profit sharing or all employee share schemes and created an index of their share prices from 1991 to 1999. Exhibit 5 shows that £100 invested in the portfolio of companies that use share based compensation plans grew to £350. However, the same £100 invested in FTSE All Share index in 1990 is worth about £250 in 1999.

As neither the Capital Strategies nor our index control for risk factors nor for the concentration of these firms in particular sectors, this evidence should be viewed as suggestive only. The consistency with our productivity results, however, lends weight to the overall conclusion that in fact shared capitalism pays off for firms. But to explore this issue further we estimated stock returns equations similar to those advocated by Wadwhani and Wall (1990).[13] The results of estimating our simple market model are contained in Exhibit 5 column 1. The simple effect of shared compensation on firm stock returns is contained in column 2. In column 2 the aggregate market return effect drops out of the estimating equation since there is only one market return per year and this is collinear with the time

[11] In equilibrium, the impact should be on price-earnings ratios, but in a period of increased use of shared compensation, such as the 1990s, it would be reflected in the growth of share prices.

[12] http://www.esop.co.uk/press/210800.htm

[13] The stock return for a company was defined as the annual change in the company return index to the 31 December year-end. The return index was derived from Datastream item RI, and captures capital appreciation and dividends re-invested on a continuous basis. The market return was calculated the same way for the FT All Share Index.

dummies. The results show a similar (but not entirely consistent) pattern to our previously established results. The effect of the all employee profit sharing scheme remains positive and significant with a point estimate of about 0.09. This translates into an effect on ex-post company stock returns of about 9.79% (from column 2 of the exhibit). The economic effect, then, is smaller than observed on productivity, but nevertheless it is still positive. In contrast to the productivity equation estimates, though, the effect of the company share option plan is not significant whereas the effect of the SAYE scheme is now significantly positive. It seems that during this period, then, companies that had adopted all employee share schemes have significantly higher stock returns. However, we would add some caveats. First, the efficient market hypothesis suggests that all economic information should be reflected immediately in the share price upon announcement of the adoption of a shared compensation scheme. Second, we can only observe whether there is a scheme in place in a particular year; we cannot observe the announcement of the adoption of the scheme. Third, the shared compensation system may be proxying firm fixed effects rather than the compensation system itself. Fourth, the system is likely to be at least partially endogenous. Firms with good stock returns are likely to share rewards with employees. Future research should investigate such issues.

Shared compensation and information/decision-making: firm level effects

An important prediction from the theory of shared compensation is that there should be a complementarity between shared compensation practices should and the allocation of decision making rights/information sharing with workers. To get at this issue we used questions from our firm level survey that relate to consultation, communication and information sharing. In particular the survey asked firms to indicate whether they had "A joint committee of managers and employees primarily concerned with **consultation** rather than negotiation", "A formal structure for **information sharing** with employees (e.g. provision of data on financial status, production and labour market position, market strategy)", and finally "A formal structure for **communication** between all levels of employees and management (e.g. quality circles, newsletters and suggestion schemes)". In addition, we created an aggregate variable which is the presence of any of these form of information/decision[14]

[14] These questions are based upon and hence similar to the WIRS/WERS questions. See the establishment level results below. The descriptive statistics for the firm level questions are contained in Appendix A.

To see whether these forms of information/decision-making are more likely in firms with shared compensation modes of pay, we regressed the dichotomous variables indicating the presence of these four forms of information/decision sharing on the presence of the shared compensation schemes in place at UK listed firms. We estimated simple probit models on the pooled data over the whole sample period. In addition to the experimental shared compensation variables, we also included two other measures pay practices. Specifically, firms were asked to indicate the existence of "Team-based performance-related pay (related to the achievement of team objectives)" and the existence of "Individual performance-related pay (merit pay or bonuses determined by agreed individual objectives)".

The results contained in Exhibit 6 report the marginal effects from the probit estimation. They show, as expected, a generally positive correlation between information sharing/decision rights and the use by firms of shared compensation structures.[15] The general pattern of results, therefore, seems to fit with the prediction from incentive theory. Having team based pay, increases the likelihood of firms using consultation, information sharing and communications systems. They are always positively correlated. Moreover, the incidence of some shared compensation systems increases the likelihood of firms adopting particular information sharing/decision making environments. For instance, approved profit sharing is generally positively related to consultation and communication systems but not information sharing. Approved SAYE schemes increase the likelihood of all forms of information sharing/decision-making. However, there is generally no relation between approved company share option plans and information sharing (except the negative impact observed for joint consultation committees). Finally, we find little evidence of a relationship between approved profit related pay schemes and decentralized decision making. This is consistent with the notion that many firms used this to get tax-advantages without really linking pay to profits. We re-consider these issues using the establishment level data below.

4. Production Function Evidence: Establishment Level Results

[15] We experimented with other estimation methods. For instance, a random effects logit model yielded similar qualitative results to those presented in the paper.

The WERS survey asks managers to rate the performance of their workplace relative to their industry on financial performance and workplace labour productivity.[16] The rating is on a five point scale, in which many more managers rate their establishment as better than average than below average. We analyze these data using an ordered probit analysis, with the outcomes ordered so that positive coefficients imply better outcomes. Our cross-section analysis links financial performance and productivity of each establishment to measures of shared compensation conditional on the number of employees, age of establishment, one digit industry, distribution of the work force by skill and gender, and with dummy variables for the degree of competition in the sector.

Exhibit 7a presents the results for the 1998 WERS cross-section. In these calculations we use two different measures of shared compensation as independent variables: a 0/1 absence/presence measure of particular types of shared compensation and, in separate calculations, a continuous measure of the percentage of non-executive workers covered by the schemes. We examine the effects of each program and also examine the effect of a simple aggregate measure of all the programs that an establishment has. Regardless of the particular measure, the results show a positive relationship between shared compensation and economic performance.

Consider first the results for financial performance. The calculations for the separate programs show that each of the measures of shared compensation are positively related to the financial performance of the firm. The largest and most significant coefficients are for employee share ownership and profit-related pay; the smallest and least significant is for deferred profit share. We are dubious about the interpretation of the profit-related pay variable, since firms that have profits are more likely to use profit-related pay, but there is no comparable reverse causality problem in the linkage between other shared compensation schemes and performance. Under the heading summary we report results when we aggregate the four shared compensation systems into a single "summated rating" (Bartholomew, 1996). The summated rating simply adds together the 0/1 variables to obtain an index from 0 to 4 depending upon how many forms of shared compensation the firm used. In the calculation the coefficient is positive and over four times its standard error, indicating that, broadly speaking, establishments with shared compensation have better performance. The next columns repeat these

[16] We have also examined the effect of shared compensation on two other variables: quality of goods or services, and changes in productivity over the previous five years, and found weaker positive effects for the impact of shared compensation on quality and stronger effects for its impact on changes in productivity than the effects shown in the

calculations with the proportion of workers covered by each system (or the summation thereof) as the independent variables. They give modestly stronger results to those with the presence of program measures.

The calculations for labour productivity show that employee share ownership and profit- related pay are significantly positively linked to productivity, while deferred profit-sharing schemes and group performance related pay are not. Again, the summated rating measure of programs yields a positive highly significant coefficient. In the last two columns, where we use the proportion of non-managerial workers covered by the schemes as the independent variables, we obtain comparable results, with employee share ownership and profit-related pay most strongly related to productivity among the individual programs. The summated rating statistic has the same strong impact on labour productivity as it did on financial performance.

In addition to the shared compensation variables we included two other human resource related measures: whether the firm has some form of individual performance related pay and no group performance pay (i.e. piece rates or commissions) and union recognition. The individual pay measures are weakly positively related to financial performance and productivity, while unionism is negatively related to financial performance and obtains an insignificant negative coefficient in the productivity equation.[17]

Finally, Exhibit 7b considers two other outcome measures: the quality of product and services and changes in labour productivity. The relationship between the experimental shared compensation variables and changes in labour productivity are qualitatively similar to those established so far. Namely, a positive relationship between shared compensation and economic performance (in this case productivity growth). On the other hand we are unable to identify a relationship between shared compensation system and the quality of products and service produced.

Shared compensation and information/decision-making: establishment effects

As noted, a key prediction of the theory of shared compensation is that establishments with shared

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exhibit.

[17] Metcalf finds that this effect occurs exclusively in establishments where competition is low, suggesting that unions are redistributing rents.

compensation practices should also share information/decision-making with workers. The WERS98 contains a module on consultation and communication that allows us to examine this prediction at the establishment level. Specifically, the WERS asks managers whether their workplace has "a system of briefings for any section or sections of the workforce"; "committees of managers and employees ... primarily concerned with consultation, rather than negotiation"; "groups at this workplace that solve specific problems or discuss aspects of performance or quality ... sometimes known as quality circles"; and "consultative committees of managers and employees in your organization that operates at a higher level than this establishment."

To see whether these forms of information/decision-making are more likely in firms with shared compensation modes of pay, we regressed 0/1 variables for presence of these four forms of information/decision sharing on the absence or presence of the shared compensation schemes for non-managerial workers at the establishment. For simplicity, we used a linear probability regression format for these computations. The results in Exhibit 8 show the expected complementarity, with share ownership and (the relatively rare) deferred profit-sharing having the most substantial link to the various forms of communication/consultation; and once again, profit-related pay showing the weakest link to the various communication/consultation groups – indeed, it is negatively related to joint consultation committees and substantially related to higher level committees. The pattern fits broadly, moreover, with what we might reasonably expect from incentive theory. Group related pay is linked to briefings, consultation committees, and quality circles, but not to higher level committees, while employee ownership and deferred profit-sharing are relatively strongly related to higher level committees, as well as to the lower-level forms of communication and consultation. But the strongest single variable that increases the probability of communication and consultation is the recognition of a union at the workplace (see Gregg and Machin, 1988).

In addition, following the same procedures that we used for analyzing our firm-based data set, we examined whether the existence of consultation and communication channels affected the link between shared compensation and outcomes and found no evidence that it did nor that the presence of both shared compensation and more communication raised productivity more than did the separate

impact of each.[18]

Longitudinal analyses

The cross relation patterns in the WERS in Exhibits 7 and 8 are consistent with the notion that shared compensation systems have beneficial economic effects and are associated with greater communication and consultation with employees. But they leave the door open to alternative interpretations of the positive relationships. One interpretation is that the data reflect unobserved differences among firms: "good firms" use shared compensation systems, consult or communicate more with employees, and have higher productivity. To examine the unobservable good firm effect we use a fixed effects longitudinal analysis that compares the same firm before and after a given change in shared compensation modes of pay. As noted earlier, fixed effects models do not resolve all questions about causality in non-experimental data – in particular there are issues relating to the endogeneity of policy – but do take us one step closer to the ideal experimental design, particularly if changes in policies reflect factors that are themselves uncorrelated with ensuing performance.

The WERS files permit two types of before/after comparisons. First, the WERS 1998 "change in the workplace" module asked managers about changes in the past five years (1993-1998) in the establishment's labour practices and economic outcomes, including what is critical to us, whether the firm increased or decreased (by a lot or a little) the proportion of non-manual workers covered by variable pay, or kept the proportion constant. By relating changes in the proportion of workers covered by variable pay to changes in other key economic measures, such as information provided workers; employee decision-making, and productivity, we have a fixed effects analysis, albeit based on questions of a retrospective nature.

Exhibit 9 shows the link between the change in variable pay, given in the rows, and changes in other variables, given in the columns. The first panel shows that firms that increased the proportion of workers receiving variable pay also increased information flows to employees while firms that decreased variable pay disproportionately reduced the information provided. The second panel shows that

[18] We entered the consultation/communication variables into the ordered probit calculations in Exhibit 6 and found they did not affect the results substantively nor did various forms of interaction between composites of the variables and shared compensation variables.

changes in variable pay and changes in employee influence over their job also moved in the same direction; while the third and fourth panels show the relation for employee influence over managerial decision-making, and "how hard people work". That in all of these cases changes in variable pay are positively related to changes in employee involvement in the work place is impressive and supportive of the incentive-based model of shared compensation systems that we sketched out above.

But what about our bottom line measure of the effect of shared compensation - labour productivity? The last panel records the link between changes in variable pay and changes in labour productivity. This can be viewed as a longitudinal test of the cross section productivity calculations in Exhibit 7a. The results are striking. 62% of managers in firms that increased variable pay a lot reported that productivity went up a lot, compared to much lower proportions of managers in firms where variable pay increased only a little, didn't change or went down. At the other end of the spectrum proportionately fewer managers in firms that increased variable pay a lot reported worsened productivity performance than did managers in firms with other changes in the proportion of workers covered by variable pay.

WERS 1990-1998 Panel

The WERS panel data identifies establishments that hanged their system of shared compensation between 1990 and 1998. Some establishments in the panel survey added non-executive stock ownership plans or profit-sharing plans while a small number withdrew such plans. If these forms of shared compensation in fact contribute to financial performance or labour productivity, we would expect to see that proportionately more managers in establishments adopting plans would see an improvement in outcomes than in other establishments and that the converse would hold for managers in establishments discarding such plans. However, given that establishments that changed their policies in any direction presumably did so in the expectation of improving outcomes, the endogeneity of the choice to change plans presumably operates against our finding such an effect. Exhibit 10 compares the results for establishments that changed their profit-sharing or non-executive ownership schemes between the 1990 and 1998 WERS surveys. It records the number that changed their programs according to their

financial performance or labour productivity in the two years. The number of firms covered is smaller than the number of changes given in the 1998 WERS panel because we deleted observations for establishments that did not respond to the 1990 survey question about profit-sharing or ownership even though the 1998 WERS panel reported a change from 1990. We were not sure this was an accurate change.

As a crude summary of the direction of change in productivity and financial performance, we have coded the responses to these questions according to a simple numeric scheme. We give a 0 to establishments that reported doing about average; 1 to those that did somewhat above average; 2 to those that did a lot above average; and -1 and -2 for the corresponding groups that did somewhat and a lot below average. We then calculated the score for each group. For instance, the number .57 in the 1990 column under profit-sharing "added" means that the 86 establishments who added a profit-sharing system had a financial performance that was modestly above average in 1990. Because managers tend to over-report their performance, this performance is in fact about average. The number .79 in the 1997 column shows that establishments who added profit sharing had that score for their financial performance in 1997. The change from 1990 to 1997 was .22, so establishments that added a profit sharing scheme improved their financial performance by that amount on our scale. Similarly, we calculated the change in performance for the 23 establishments that removed a profit sharing scheme in the period. This is .05. The difference in difference calculation for the establishments is obtained by comparing the change in the summary statistic for establishments that added a program and the change in the summary statistic for establishments that removed the program. Positive differences in differences imply that the shared compensation system improved an outcome while negative differences imply that it made matters worse. In our case, this is .17, which means that firms who added profit sharing improved their performance relative to firms that reduced profit-sharing.

The results in Exhibit 10 show that in three of the four of the comparisons, the differences in differences are positive, implying that with this simple scale, firms that introduced programs had improved performance relative to firms that removed programs. The small samples, however, make this at best a suggestive result.

5. Conclusions

The use of shared compensation arrangements by companies increased considerably in the 1990s, with the biggest growth occurring among employee ownership schemes. Our firm level survey indicates that companies were much more likely to use Profit Sharing Schemes, Save as You Earn Schemes, and Company Share Option Plans (CSOPs) in 1998 compared with 1995. Our establishment level panel data showed an increase in the proportion of establishments with profit sharing and with non-executive ownership schemes.

In part, the growth of shared compensation can be attributed to government policies that introduced tax incentives to encourage shared compensation systems in an attempt to enhance corporate productivity. In this respect, the policies of the UK to encourage shared compensation differ noticeably from those of the US. The UK encourages individual ownership while the US encourages collective ownership through ESOPs. The market rather than the state has spurred the growth of options and individual share ownership in the US.

Shared capitalist modes of pay should improve the economy in two ways. They should increase communication and consultation with workers, which spurs economic democracy. Our evidence shows that shared compensation is indeed linked to various forms of communication and consultation. They also should ideally induce employees to think and act like owners, making decisions that increase corporate value. Our evidence shows that shared compensation systems in the UK are positively associated with productivity, though as in other studies, we find that the effect of the systems varies across data sets and measures of outcomes.

Exhibit 1: UK Programs to Encourage Shared Capitalism All Employee Schemes

Approved profit related pay

In 1987 the scheme was introduced for employers to pay a profit related compensation package. Initially tax relief was given on half of the profit related payments up to a limit of the lower of £3,000 or 20% of the employee's pay. The cash limit was increased to £4,000 in 1989. In 1991 the tax relief was increased to the whole of the payment. In the Finance Act of 1997, the income tax relief was set to be phased out over a 3 to 4 year period. For profit periods beginning in 1998 the cash ceiling was reduced to £2,000 and for periods beginning in 1999 the ceiling was reduced to £1000. As of January 2000, this scheme is now no longer running.

Approved profit sharing scheme

The approved profit sharing scheme is a vehicle for companies to provide free shares to employees that are free from tax liabilities. Profit sharing schemes were introduced in the 1978 Finance Act. In 2000 there were about 950 approved profit sharing schemes in operation with an estimated cost to the Government in tax relief of £150 million. Profit sharing schemes must be open to any employee who has been employed by the company for more than 5 years. There are about 1.25 million participants covered under these arrangements (source: www.proshare.org). However, the approved profit sharing scheme is being phased out with the introduction of the new all-employee plan.(source: www.inlandrevenue.gov.uk).

New All employee Share Plan (2000).

Firms can give free shares tax free; employees buy shares out of pre-tax income; firms can match employee purchases. Employees who leave firm must withdraw shares. Firm has flexible performance criterion for Tax relief: employees who keep shares for 5 years in "ESOP" trust pay no income tax; pay capital gains only on increase in value. Companies get relief for costs of providing shares for employees. .

Approved Save As You Earn Scheme

The Save as You Earn (SAYE) scheme, or savings related option scheme, is an arrangement such that an employee has the right to buy shares at a future date at a pre-specified purchase price. The company grants employees the option to buy the company's shares in 3, 5 or 7 years time. The price is either the current market price or the option can be issued at a discount of up to 20% of that price. The scheme has to be open to all employees of the company with more than 5 years' service (source: www.inlandrevenue.gov.uk). There are currently over 1200 such SAYE in operation with an estimated cost to the Government in tax relief of £600 million. There are about 1.75 million participants covered under these arrangements (source: www.proshare.org).

Management/special employee schemes

Approved Company Share Option Plan

The approved company share option plan (CSOP) is a scheme under which an employee has the right to purchase a fixed number of shares at a pre-determined price at some date in the future. Under this scheme options may not be offered at a discount. The employee does not pay income tax on the grant of the option or any increase in the market value of shares before the option is exercised. Unlike SAYE schemes discretion is given to the company as to which employees are eligible and are granted options. They tend to be granted to company directors. There are currently over 3,750 such approved CSOPs in operation with an estimated cost to the Government in tax relief of £130 million. There are about 450,000 participants covered under these arrangements (source: www.proshare.org).

Exhibit 2: Percentages of Employees with Shared Compensation in British Establishments, 1998

i. Any employees eligible for variable pay scheme (WERS 1998, weighted)

	Establishment N %	Employees Sum %
Profit-related payments or bonuses	31.8%	37.4%
Deferred profit sharing schemes	5.8%	6.4%
Employee share ownership schemes	14.6%	22.0%
Other Cash Bonus Schemes	21.2%	24.7%
Any Variable Pay Scheme	53.0%	63.8%

ii. Non-managerial employees eligible for variable pay scheme (WERS 1998, weighted)

	Establishment N %	Employees Sum %
Profit-related payments or bonuses	27.9%	34.5%
Employee share ownership schemes	12.9%	20.4%
Any Group Performance Related Schemes	11.5%	17.3%

iii. All employees (WERS Panel, 1990-1998, unweighted)

	Establishment N %	Employees Sum %
Profit-related payments or bonuses	41.1%	40.3%
Deferred profit sharing schemes	7.8%	8.5%
Non-Executive Employee share ownership	7.9%	6.1%
SAYE share options	30.0%	28.9%
Discretionary of executive share ownership schemes	20.8%	25.5%

Source: WERS98, WERS Panel 1990-98

Exhibit 3a: Compensation Strategies for All Employees in Firm-Based Data Set

Compensation Strategy	Percentage of firms in year			
	1995	**1996**	**1997**	**1998**
Approved profit-sharing scheme	18.9%	19.0%	22.0%	25.1%
Other share-based profit-sharing scheme	4.3%	5.9%	8.8%	10.4%
Cash-based profit-sharing scheme	13.6%	14.5%	15.9%	17.1%
Approved profit-related-pay scheme	27.6%	34.7%	38.1%	36.9%
Gain-sharing scheme: (company-wide bonus scheme related to improvements in productivity)	3.2%	3.5%	4.4%	4.7%
Approved SAYE share-option scheme	31.1%	35.6%	43.7%	45.8%
Other all-employee share-option scheme	6.1%	9.3%	11.5%	12.4%
Approved Company Share-Option Plan	41.2%	45.8%	54.6%	56.6%
Other discretionary share-option scheme	22.9%	31.1%	40.7%	42.8%

Exhibit 3b: Compensation Strategies by Management/Non-Management Employees

Compensation Strategy	Management				Non-Management			
	1995	**1996**	**1997**	**1998**	**1995**	**1996**	**1997**	**1998**
Approved profit-sharing scheme	77.0%	79.5%	73.8%	78.5%	62.8%	65.1%	62.7%	65.1%
Other share-based profit-sharing scheme	40.6%	44.6%	51.5%	43.2%	17.0%	11.3%	21.8%	17.7%
Cash based profit-sharing scheme	72.1%	69.0%	69.9%	65.2%	49.5%	49.7%	47.4%	45.5%
Approved profit-related-pay scheme	87.1%	89.0%	90.2%	87.3%	85.7%	86.9%	88.1%	86.5%
Gain-sharing scheme	80.0%	82.5%	76.8%	78.8%	61.4%	53.8%	53.4%	58.1%
Approved SAYE share-option scheme	63.3%	63.6%	61.3%	61.5%	47.6%	49.6%	47.4%	49.4%
Other all-employee share-option scheme	62.8%	71.9%	65.2%	68.3%	59.7%	48.1%	50.4%	50.8%
Approved company share-option scheme	52.0%	54.8%	56.0%	56.3%	13.2%	16.5%	18.7%	18.6%
Other discretionary share-option scheme	39.2%	38.0%	40.9%	44.2%	10.6%	9.9%	11.5%	10.8%

Notes:

1. Based on a sample of 299 UK stock market firms surveyed in 1999. Actual numbers of firms per cell may differ.
2. The results in Table 1B are conditional upon the firm having the particular compensation strategy.

Exhibit 4: Firm Level Productivity Regressions (fixed effects); the Impact of Shared Modes of Compensation in UK Listed Firms 1995-1998

	(1)	(2)	(3)	(4)	(5)
Log (employment)	0.6990**	0.6997**	0.7018**	0.7018**	0.6990**
	(0.0885)	(0.0867)	(0.0888)	(0.0866)	(0.0855)
Log (capital)	0.1707**	0.1690**	0.1690**	0.1833**	0.1870**
	(0.0400)	(0.0398)	(0.0397)	(0.0471)	(0.0479)
Union	-0.0444	-0.0318	-0.0279	-0.0282	-0.0593
	(0.0502)	(0.0460)	(0.0456)	(0.0441)	(0.0529)
Competition	-0.1244	-0.1667	-0.1624	-0.0061	0.0337
	(0.1818)	(0.1670)	(0.1680)	(0.1103)	(0.1305)
Approved profit sharing scheme	0.1739**	-	-	-	0.1733**
	(0.0704)				(0.0728)
Approved profit related pay scheme		0.0369	-	-	0.0446
		(0.0605)			(0.0625)
Approved all employee share option scheme SAYE			-0.0142	-	-0.0292
			(0.0396)		(0.0409)
Approved company share option scheme				0.1314**	0.1213**
				(0.0578)	(0.0594)
Observations	942	938	942	936	932
Firms	284	283	284	283	282
Year dummies	Yes	Yes	Yes	Yes	Yes
Time period	1995-98	1995-98	1995-98	1995-98	1995-98
Adjusted R^2	0.9826	0.9824	0.9824	0.9824	0.9825

Notes:
1. Dependent variable is log of total output.
2. ♣ <p0.10; *p<0.05; **p<0.01. Robust standard errors reported in parentheses.
3. All regressions contain an unreported arbitrary constant.

Exhibit 4 (cont.): Firm Level Productivity Regressions (fixed effects); Management and Non-Management Participation in Shared Compensation Schemes

	(6)	(7)
	Employees: Managerial employees	Employees: Non-Managerial employees
Log (employment)	0.7015**	0.7039**
	(0.0886)	(0.0905)
Log (capital)	0.1891**	0.1937**
	(0.0491)	(0.0488)
Union	-0.0333	-0.0404
	(0.0517)	(0.0564)
Competition	-0.0306	0.0310
	(0.1241)	(0.0970)
Approved profit sharing scheme (% employees participating)	0.1128**	0.1975**
	(0.0625)	(0.0693)
Approved profit related pay scheme (% employees participating)	-0.0464	-0.0643*
	(0.0382)	(0.0364)
Approved all employee share option scheme SAYE (% employees participating)	-0.0066	-0.0159
	(0.0701)	(0.0833)
Approved company share option scheme (% employees participating)	0.1065	-0.0356
	(0.0913)	(0.0931)
Observations	932	932
Firms	282	282
Year dummies	Yes	Yes
Time period	1995-98	1995-98
Adjusted R^2	0.9823	0.9823

Notes:
1. Dependent variable is log of total output.
2. ♣ <p0.10; *p<0.05; **p<0.01. Robust standard errors reported in parentheses.
3. All regressions contain an unreported arbitrary constant.
4. Column 1 the employees participating in any shared compensation scheme are managerial employees. In column 2 it is non-managerial employees.

Exhibit 5: Firm Level Stock Returns (OLS Estimates) and Shared Compensation Systems.

	(1)	(2)
	Firms' annual stock returns	Firms' annual stock returns
Approved profit sharing scheme (% employees participating)	0.0910**	0.0935**
	(0.0314)	(0.0308)
Approved profit related pay scheme (% employees participating)	0.0223	0.0157
	(0.0293)	(0.0287)
Approved all employee share option scheme SAYE (% employees participating)	0.0749**	0.0815**
	(0.0299)	(0.0292)
Approved company share option scheme (% employees participating)	0.0204	0.0308
	(0.0312)	(0.0301)
Return on FT All Share index	1.12**	-
	(0.434)	
Observations	913	913
Industry effects	Yes	Yes
Year dummies	No	Yes
Time period	1995-98	1995-98
R^2	0.043	0.103

Notes:
1. Dependent variable is firm shareholder return (defined as the annual change in the Datastream return index for each company)
2. ♣ <p0.10; *p<0.05; **p<0.01. Robust standard errors reported in parentheses.
3. All regressions estimated by OLS

Exhibit 6: The Relationship between Shared Compensation, Communication and Consultation: Firm Level Estimates

	Dependent Variables							
	Joint Consultation Committees		Information sharing		Communication structure		Any consultation/communication	
	B	Std. Error	B	Std. Error	B	Std. Error	B	Std. Error
Approved Profit Sharing (YN)	0.096*	0.034	0.043	0.043	0.152*	0.046	0.186*	0.044
Approved Profit Related Pay (YN)	-0.004	0.026	-0.044	0.037	0.103*	0.038	0.112*	0.038
Approved SAYE (YN)	0.072*	0.026	0.102*	0.037	0.107*	0.039	0.138*	0.038
Approved Company Share Option Plan (YN)	-0.082*	0.024	-0.035	0.034	-0.011	0.037	-0.046	0.036
Team based pay (YN)	0.081	0.041	0.121	0.050	0.275	0.049	0.239	0.046
Individual performance related pay (YN)	0.016	0.024	0.162	0.034	0.117	0.037	0.151	0.037
Log (real sales)	✓		✓		✓		✓	
Log (total employees)	✓		✓		✓		✓	
Union recognised in workplace (Y/N)	✓		✓		✓		✓	
Industry – 1 digit SE dummies (YN)	✓		✓		✓		✓	
Year dummies (YN)	✓		✓		✓		✓	
	✓		✓		✓		✓	
Constant	✓		✓		✓		✓	
Number of Observsations	928		965		965		969	
Pseudo R-Squared	0.247		0.175		0.201		0.241	

Source: Own survey, marginal effects reported, robust standard errors (SE) presented.

Exhibit 7a: Ordered Probit Estimates of the Link between Shared Compensation and Financial Pe rformance and Labour Productivity (Source: WERS 1998 Cross-section)

	Financial Performance (5 point scale)								Labour Productivity (5 point scale)							
	Presence (YN)				Coverage (%)				Presence (YN)				Coverage (%)			
	Separate		Summary		Separate		Summary		Separate		Summary		Separate		Summary	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Profit-related pay (YN)	0.18	0.06	-	-	0.19	0.07	-	-	0.14	0.07	-	-	0.18	0.07	-	-
Deferred profit sharing (YN)	0.08	0.10	-	-	0.10	0.10	-	-	0.01	0.10	-	-	0.04	0.10	-	-
Employee Share Ownership (YN)	0.21	0.07	-	-	0.23	0.08	-	-	0.25	0.07	-	-	0.23	0.08	-	-
Any Group performance related pay (YN)	0.11	0.07	-	-	0.08	0.10	-	-	0.04	0.08	-	-	0.12	0.10	-	-
Number of Group Variable Pay Schemes	-	-	0.14	0.03	-	-	-	-	-	-	0.12	0.03	-	-	-	-
Sum % Eligible for Group Variable Pay	-	-	-	-	-	-	0.19	0.04	-	-	-	-	-	-	0.19	0.04
Individual performance related pay only (YN)	0.07	0.12	0.07	0.12	0.10	0.19	0.12	0.19	0.07	0.12	0.09	0.12	0.31	0.20	0.32	0.20
Union recognised in workplace (Y/N)	-0.13	0.06	-0.12	0.06	-0.14	0.06	-0.13	0.06	-0.06	0.06	-0.05	0.06	-0.06	0.06	-0.05	0.06
Age of Establishment (Years)	✓		✓		✓		✓		✓		✓		✓		✓	
Number of Employees (N)	✓		✓		✓		✓		✓		✓		✓		✓	
Women in the workplace (%)	✓		✓		✓		✓		✓		✓		✓		✓	
Skilled- 3 levels (%)	✓		✓		✓		✓		✓		✓		✓		✓	
Industry - 11 levels (YN)	✓		✓		✓		✓		✓		✓		✓		✓	
Competition- 5 levels (YN)	✓		✓		✓		✓		✓		✓		✓		✓	
Cut 1	-2.35	0.16	-2.35	0.16	-2.36	0.16	-2.35	0.16	-2.26	0.16	-2.27	0.16	-2.27	0.16	-2.27	0.16
Cut 2	-1.37	0.13	-1.38	0.13	-1.39	0.13	-1.38	0.13	-1.34	0.13	-1.34	0.13	-1.34	0.13	-1.34	0.13
Cut 3	-0.07	0.12	-0.08	0.12	-0.09	0.12	-0.09	0.12	0.26	0.13	0.25	0.12	0.25	0.13	0.26	0.13
Cut 4	1.13	0.12	1.11	0.12	1.10	0.12	1.11	0.12	1.52	0.13	1.50	0.13	1.52	0.13	1.52	0.13
Number of Observations	1772		1773		1767		1767		1691		1692		1685		1685	
Pseduo R-Squared	0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.014	

Exhibit 7b: Ordered Probit Estimates of the Link between Shared Compensation and Quality of Product and Services and Changes in Labour Productivity (Source: WERS 1998 Cross-Section)

	Quality of Product and Services (5 point scale)								Changes in Labour Productivity (5 point scale)							
	Presence (YN)				Coverage (%)				Presence (YN)				Coverage (%)			
	Separate		Summary		Separate		Summary		Separate		Summary		Separate		Summary	
	B	B	SE	B	SE	B	SE	B	SE	SE	B	SE	B	SE	B	SE
Profit-related pay (YN)	0.08	0.06	-	-	0.17	0.07	-	-	0.19	0.07	-	-	0.25	0.08	-	-
Deferred profit sharing (YN)	-0.04	0.10	-	-	-0.03	0.10	-	-	-0.08	0.11	-	-	-0.06	0.11	-	-
Employee Share Ownership (YN)	0.07	0.07	-	-	0.02	0.08	-	-	0.14	0.08	-	-	0.13	0.08	-	-
Any Group performance related pay (YN)	0.06	0.07	-	-	0.10	0.10	-	-	0.30	0.08	-	-	0.35	0.10	-	-
Number of Group Variable Pay Schemes	-	-	0.04	0.03	-	-	-	-	-	-	0.14	0.03	-	-	-	-
Sum % Eligible for Group Variable Pay	-	-	-	-	-	-	0.10	0.04	-	-	-	-	-	-	0.22	0.04
Individual performance related pay only (YN)	-0.19	0.11	-0.19	0.11	-0.13	0.17	-0.12	0.17	0.29	0.12	0.24	0.12	0.23	0.19	0.21	0.19
Union recognised in workplace (Y/N)	-0.26	0.06	-0.26	0.06	-0.26	0.06	-0.27	0.06	0.22	0.06	0.22	0.06	0.22	0.06	0.20	0.06
Age of Establishment (Years)	✓		✓		✓		✓		✓		✓		✓		✓	
Number of Employees (N)	✓		✓		✓		✓		✓		✓		✓		✓	
Women in the workplace (%)	✓		✓		✓		✓		✓		✓		✓		✓	
Skilled- 3 levels (%)	✓		✓		✓		✓		✓		✓		✓		✓	
Industry - 11 levels (YN)	✓		✓		✓		✓		✓		✓		✓		✓	
Competition - 5 levels (YN)	✓		✓		✓		✓		✓		✓		✓		✓	
Cut 1	-3.14	0.24	-3.16	0.24	-3.13	0.24	-3.14	0.24	-2.11	0.16	-2.12	0.15	-2.12	0.16	-2.12	0.15
Cut 2	-2.02	0.13	-2.03	0.13	-2.00	0.13	-2.01	0.13	-1.33	0.13	-1.35	0.13	-1.34	0.13	-1.35	0.13
Cut 3	-0.60	0.12	-0.61	0.12	-0.59	0.12	-0.60	0.12	-0.49	0.12	-0.51	0.12	-0.51	0.12	-0.51	0.12
Cut 4	0.83	0.12	0.82	0.12	0.85	0.12	0.83	0.12	0.59	0.12	0.57	0.12	0.58	0.12	0.57	0.12
Number of Observations	1878		1879		1872		1872		1830		1831		1823		1823	
Pseduo R-Squared	0.03		0.03		0.03		0.03		0.02		0.02		0.02		0.02	

Exhibit 8: Regression Estimates of the Relatinship between Shared Compensation for Non-Managerial Employees and Communication and Consultation

	Dependent Variables							
	Joint Consultation							
	Briefings		Committees		Quality Circles		High Level JCC	
	B	Std. Error	B	Std. Error	B	Std. Error	B	Std. Error
Profit-related pay (YN)	0.03	0.02	0.05	0.03	0.09	0.03	0.06	0.03
Deferred profit sharing (YN)	0.06	0.03	0.15	0.04	0.15	0.04	0.14	0.04
Employee Share Ownership (YN)	0.04	0.02	0.06	0.03	0.08	0.03	0.09	0.03
Any Group performance related pay (YN)	0.06	0.02	0.06	0.03	0.07	0.03	0.02	0.03
Individual performance related pay only (YN)	0.05	0.03	0.08	0.05	0.04	0.05	0.04	0.05
Union recongised in workplace (Y/N)	0.09	0.02	0.19	0.02	0.13	0.03	0.27	0.02
Age of Establisment (Years)	✓		✓		✓		✓	
Number of Employees (N)	✓		✓		✓		✓	
Women in the workplace (%)	✓		✓		✓		✓	
Skilled- 3 levels (%)	✓		✓		✓		✓	
Industry - 11 levels (YN)	✓		✓		✓		✓	
Competition- 5 levels (YN)	✓		✓		✓		✓	
Constant	0.72	0.03	0.28	0.05	0.26	0.05	0.19	0.05
Number of Observsations	2075		2075		2074		2031	
R-Squared	0.08		0.15		0.09		0.18	
Adjusted R-Squared	0.06		0.14		0.79		0.17	
Std Error of the Estimate	0.30		0.46		0.48		0.46	

Source: WERS 1998

Exhibit 9: Change in the Proportion of Variable Pay for Non-Managerial Workers by Changes in Work Place Activities Over a Five-Year Period (1993-1998).

i. Change in information provided by employers by change in proportion of variable pay for non-managerial workers

% within Change: proportion of variable pay for non-managerial employees

		Change: information provided to employees				
		up a lot	up a little	no change	gone down	Total
Change: proportion of variable pay for non-managerial employees	up a lot	67.8%	24.6%	6.2%	1.4%	100.0%
	up a little	53.1%	30.7%	16.0%	.2%	100.0%
	no change	41.3%	37.6%	19.9%	1.3%	100.0%
	gone down	36.7%	38.8%	22.4%	2.0%	100.0%
Total		47.0%	34.5%	17.5%	1.0%	100.0%

ii. Change in employees influence over job by employers by change in proportion of variable pay for non-managerial workers

% within Change: proportion of variable pay for non-managerial employees

		Change: employees influence over job				
		up a lot	up a little	no change	gone down	Total
Change: proportion of variable pay for non-managerial employees	up a lot	31.3%	50.2%	17.1%	1.4%	100.0%
	up a little	21.3%	48.8%	28.1%	1.7%	100.0%
	no change	12.6%	44.2%	38.4%	4.8%	100.0%
	gone down	18.4%	36.7%	36.7%	8.2%	100.0%
Total		16.9%	45.8%	33.5%	3.8%	100.0%

iii. Change in how hard people work by employers by change in proportion of variable pay for non-managerial workers

% within Change: proportion of variable pay for non-managerial employees

		Change: how hard people work				
		up a lot	up a little	no change	gone down	Total
Change: proportion of variable pay for non-managerial employees	up a lot	55.0%	33.2%	10.9%	.9%	100.0%
	up a little	43.7%	42.4%	12.2%	1.7%	100.0%
	no change	39.8%	37.3%	21.3%	1.6%	100.0%
	gone down	39.6%	29.2%	22.9%	8.3%	100.0%
Total		42.4%	37.9%	18.0%	1.7%	100.0%

iv. Change in employee influence over managerial decision-making by employers by change in proportion of variable pay for non-managerial workers

% within Change: proportion of variable pay for non-managerial employees

		Change: employee influence over managerial decision-making				
		up a lot	up a little	no change	gone down	Total
Change: proportion of variable pay for non-managerial employees	up a lot	20.9%	48.3%	28.9%	1.9%	100.0%
	up a little	10.2%	49.7%	37.7%	2.3%	100.0%
	no change	7.6%	39.6%	50.5%	2.3%	100.0%
	gone down	8.0%	24.0%	52.0%	16.0%	100.0%
Total		9.7%	42.6%	45.0%	2.6%	100.0%

v. Change in labour productivty by employers by change in proportion of variable pay for non-managerial workers

% within Change: proportion of variable pay for non-managerial employees

		Change: labour productivty				
		up a lot	up a little	no change	gone down	Total
Change: proportion of variable pay for non-managerial employees	up a lot	62.1%	28.2%	5.8%	3.9%	100.0%
	up a little	47.1%	39.1%	9.7%	4.1%	100.0%
	no change	40.4%	38.4%	17.1%	4.2%	100.0%
	gone down	37.5%	31.3%	18.8%	12.5%	100.0%
Total		44.4%	37.2%	14.0%	4.3%	100.0%

Source: WERS 1998

Exhibit 10: Number of Establishments with Varying Levels of Financial Performance and Labour Productivity in 1990 and 1997, by Change in Shared Compensation Systems, 1990-1997

	Profit Sharing				Non-Exec Share Ownership			
Financial Performance	Added		Removed		Added		Removed	
Relative to Average	1990	1997	1990	1997	1990	1997	1990	1997
A lot Below	4	2	2	0	0	0	2	1
Below	7	4	1	1	0	3	3	3
Average	35	26	7	12	17	15	9	11
Above Average	16	32	9	6	14	9	8	9
A lot Above	24	22	4	4	9	13	8	6
Total	86	86	23	23	40	40	30	30
Average Score	.57	.79	.52	.57	.80	.80	.57	.53
Change,1997-1990	.22		.05		.00		.04	
Diff in Difference	.17				-.04			
Labour Productivity								
Relative to Average	1990	1997	1990	1997	1990	1997	1990	1997
A lot Below	1	3	0	0	0	0	1	2
Below	12	11	0	0	2	3	2	4
Average	36	33	8	15	22	19	18	11
Above Average	33	33	16	6	13	12	9	13
A lot Above	12	14	5	8	5	8	5	5
Total	94	94	29	29	42	42	35	35
Average Score	.46	.47	.90	.76	.50	.60	.43	.43
1997-1990	.01		-.14		.10		.00	
Diff in Difference	.15				.10			

Source: Calculated from 1990-1998 WERS panel, with average scores based on assigning 0 to average 1 to above average, 2 to a lot above average; -1 to below average; -2 to a lot below average

Appendix A: Descriptive Statistics on the Firm Level Data

Variable	**Year**			
	1995	**1996**	**1997**	**1998**
Log (real output)	10.84	10.66	10.65	10.75
Log (employment)	6.04	5.90	5.86	5.96
Log (capital)	10.47	10.29	10.31	10.41
Trade unions/staff associations recognised by management for negotiating pay and conditions	24.3%	23.5%	23.4%	23.4%
Competition (greater than 5 product market competitors)	71.9%	73.6%	75.6%	76.9%
Information sharing (which is an indicator variable if the firm has any one of the following three practices)	43.1%	48.4%	56.5%	61.2%
a) A joint committee of managers and employees primarily concerned with **consultation** rather than negotiation	13.6%	15.2%	18.0%	18.7%
b) A formal structure for **information sharing** with employees (e.g. provision of data on financial status, production and labour market position, market strategy)	27.6%	32.9%	37.6%	41.5%
c) A formal structure for **communication** between all levels of employees and management (e.g. quality circles, newsletters and suggestion schemes)	39.6%	43.3%	48.8%	53.2%

Notes:

1. Based on a sample of 299 UK stock market firms surveyed in 1999. Actual numbers of firms per cell may differ.

Appendix B: Firm Level Productivity Regressions (Fixed Effects); The Impact of Shared Compensation Systems in UK Listed Firms 1995-1998. Interaction Effects Between Information Sharing Included.

	(1)	(2)	(3)	(4)	(5)
Log (employment)	0.6990**	0.6995**	0.7030**	0.7028**	0.7016**
	(0.0886)	(0.0851)	(0.0890)	(0.0855)	(0.0834)
Log (capital)	0.1679**	0.1625**	0.1691**	0.1785**	0.1783**
	(0.0405)	(0.0392)	(0.0402)	(0.0462)	(0.0484)
Union	-0.0520	-0.0081	-0.0244	-0.0346	-0.0378
	(0.0509)	(0.0405)	(0.0451)	(0.0454)	(0.0503)
Competition	-0.1264	-0.1688	-0.1612	-0.0059	0.0384
	(0.1784)	(0.1649)	(0.1661)	(0.1077)	(0.1277)
Information sharing	-0.0288	-0.0036	-0.0481	0.0046	0.0034
	(0.0785)	(0.0742)	(0.0809)	(0.0544)	(0.0826)
Approved profit sharing scheme	0.2459**	-	-	-	0.2206**
	(0.0968)				(0.1048)
Approved profit sharing scheme × info. Sharing	-0.0936	-	-	-	-0.0540
	(0.0988)				(0.1050)
Approved profit related pay scheme		0.1646	-	-	0.1320
		(0.1370)			(0.1377)
Approved profit related pay scheme × info. Sharing		-0.1828	-	-	-0.1221
		(0.1258)			(0.1279)
Approved all employee share option scheme SAYE			-0.0344	-	-0.0764
			(0.0759)		(0.0889)
Approved all employee share option scheme SAYE × info. Sharing			0.0335	-	0.0765
			(0.0805)		(0.0940)
Approved company share option scheme				0.2278**	0.2182**
				(0.1140)	(0.1188)
Approved company share option scheme × info. Sharing				-0.1512	-0.1495
				(0.1143)	(0.1214)
Observations	942	938	942	936	936
Firms	284	283	284	283	283
Years	Yes	Yes	Yes	Yes	Yes
Time period	1995-98	1995-98	1995-98	1995-98	1995-98
Overall R^2	0.9826	0.9825	0.2929	0.9825	0.9826

Notes:

1. Dependent variable is log of total output.
2. ♣ <p0.10; *p<0.05; **p<0.01. Robust standard errors reported in parentheses.

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